

Microscope Projection System – Nathan Legrand Leavitt

HOW I USE TECHNOLOGY IN INOVATIVE WAYS:

I teach Biology and Anatomy and Physiology at West Side High School. I love technology! Technology excites and intrigues the students and myself. It has enabled me to teach in an untraditional manner and be more effective at what I teach.

The Internet has become an important and innovative use of technology in my classes. One example of how I use the Internet resources is as follows: I assign different diseases to a small group of students and let them teach their peers. Students are required to create presentations using images from the Internet and scanned images from textbooks. They usually choose to do power point presentations to prepare and present the information. I also use the images that the students and I find to create my assessments. For example, I show an image of an individual with a particular disease and then ask students to diagnose, describe the symptoms, causes, and treatments for that disease.

Another innovative and effective use of technology I use in my classes is video production technology. In Anatomy and Physiology, we use video technology by having students create videos in which they act out the symptoms of an assigned disease. We watch the disease videos and the other students in the class are required to diagnose symptoms and propose treatments. This use of technology is highly effective and motivating for the students.

I also use video technology when we study the muscular and skeletal system in Anatomy and Physiology. I have small groups of students come up with three or four-minute jingles that help other students in the class learn the different parts of that system. Some of the jingles have become effective teaching tools for future classes.

I also use a video produced by students to teach many different lab skills. For example, rather than me lecturing students on lab techniques, procedures and safety, I use a video that students have created. The video shows what is permissible in lab and what is incorrect and unsafe. The students' video turned out to be a hilarious, creative, and an effective tool for reviewing the laboratory procedures.

Internet and Power Point are additional innovative uses of technology in my classes. As we study different biological systems my students must research those systems on the Internet. I require that they find images, animations and video clips that demonstrate how that system functions. The students then create power point presentations on the topic or system they have been assigned. These presentations have been powerful teaching tools because the students have to understand the concepts well in order to do the research and produce the presentations. The school has one projector in a multimedia room that the teachers share. We use this facility to view the projects that the students have constructed.

Email is also a surprisingly effective and innovative use of technology we use in my classes. For example, my students and I have spent time communicating with professors at Idaho State University on a number of topics dealing with their research and discoveries in various fields. Last year we corresponded with one of the leading Neurologists at ISU. He was able to send us images and video of research that he had done on the brains of salamanders. We were then able to compare the information that he shared with us to the information on the human brain. As questions would arise, we were able to email this professor and get relatively quick and updated answers. These correspondences were simple yet very effective learning tools in the classroom.

HOW TECHNOLOGY HAS IMPACTED STUDENT PERFORMANCE:

The Internet has empowered me as a teacher! It is the most convenient and accessible means of supplementing my classes. The Internet has allowed me to engage the less motivated students and make the information more meaningful and concrete for all others.

The images that I use from the Internet are invaluable to engaging my students and increasing their learning. A simple example of the importance of this technology in my classroom is as follows: During the genetics unit we discuss genetic disorders such as Down's syndrome, klinefelter's syndrome, or polyploidy. The Biology textbook only describes what causes the disease and its symptoms. However, I have found hundreds of images on the Internet of people with these illnesses. I have observed that students who are not normally interested in science are more attentive, motivated, and inquisitive when I use Internet technology to enhance my teaching. When I use technology they are much more likely to share experiences and ask questions regarding the images.

I discovered that as I used technology to teach, the students remembered the material in much more detail and for longer periods of time than students who I taught in previous years without the technology. For example, last year I had just completed grading my biology classes' tests in which only about 37% of the class had received 72% or higher. I felt like I had given the students all the information they needed to do well, but it was nearing Christmas break and student motivation was low. I decided to experiment with technology. I had my students search the Internet and prepare a presentation on protein synthesis, the topic they had just been tested over. The results were surprising! Some of my students approached me sometime later and described that the material they remembered most in biology came from those presentations. I was also surprised to find that about 78% of the class earned a 72% or higher on the second assessment.

Some of the chapters of Anatomy and Physiology can be very difficult to teach and learn. During my first couple years teaching, the chapters on the skeletal system and muscular system were monotonous and tedious. After two weeks of learning terms and memorizing areas on bones, many of the students lost their initial interest and enthusiasm for the subject matter. I decided to use technology to infuse my class with a little excitement and creativity. The students produced and videotaped skits to teach their peers about the muscles and bones. These projects were very successful and entertaining. I found that they turned difficult and tedious subject matter into creative and exciting projects that helped the students to learn the information more completely than I had experienced previously.

One of the most effective teaching tools that I use for lab safety came from students using video technology. Students produced a video that showed the dos and don'ts in the laboratory. First, they showed how to correctly use equipment such as microscopes, incubators, Bunsen burners, etc. After each correct demonstration, the students showed the potential results of misusing equipment in the lab. The video was both creative and informative. Students remembered what they were taught much better because it was in a visual form. Students rarely carry their microscopes incorrectly or forget how to use the lab equipment correctly. I attribute this to the visual manner in which I used technology to teach.

BUDGET NARATIVE FOR THE PROJECT:

With this grant I propose to purchase the following items:

First, I will purchase a projector that is capable of projecting high-resolution images onto a screen. The best price I was able to find was \$1350.00.

Additional costs for the projector include a Spare lamp and a projector installation kit. The Spare lamp is \$360.00. The installation kit includes a mounting tile for false ceilings, ceiling extension pole and camera mounting bracket. It costs \$170.00.

Secondly, I plan to purchase a Microscope video camera. This apparatus contains a few different parts including the camera itself, camera-eyepiece adaptor, and cables that run to the projector. I am able to purchase these items for \$935.00 including shipping.

Total projected costs for the technology are \$2815.00.

HOW MY PROPOSAL WILL ENHANCE MY TEACHING:

The projection and micro-video system that I am proposing will enhance the way I teach and improve my students' performance! Currently the science department does not readily have access to this technology. This technology is powerful and will have far reaching implications.

As a science teacher I am extremely excited about projecting images from the microscope. Imagine how much more powerful my lessons will be when, instead of simply drawing cells and cell parts, I am able to project actual images from a microscope that the entire class can view at once!

Biology and Anatomy and Physiology are really classes about cells. My curriculum consists 75% of discussing cells and cellular function. Imagine how powerful the impact of projecting an actual microscope slide of some tissue along side a transparency with an artistic rendering of the same tissue. Student learning would be augmented immensely! They would not be as confused by the unrealistic drawings in the book. Students will be able to gain a realistic understanding of these microscopic organisms and tissues.

This proposed technology will encourage and sustain student interest by allowing me to use the Internet with much greater efficacy. Currently I do not readily have access the technology I am proposing. As a result, when I use images or video from the Internet I either make color transparencies, photocopies, or my students must crowd around my computer. This technology will allow me to project images and internet videos directly to a screen in my room therefore eliminating the impracticality and inconvenience of showing an image or video clip using my personal computer or printing low-quality transparencies.

The implications of projecting actual Internet pages and digital images are practically limitless. When we study diseases and disorders students will learn the causes and be able to study and diagnose illnesses better because they can visualize the symptoms and causes for them. Currently I feel like my discussions on diseases do not engage the students to the extent that I would like. This technology will allow me to prepare lessons that are more impacting, motivating and interesting.

Preparing my students for the Idaho Standard Achievement Test (ISAT) is a major concern of mine. Diffusion, DNA replication, protein synthesis, cellular respiration, photosynthesis, and ecology are a few examples of the key biological concepts will be on ISAT. They are also very challenging for students to visualize and understand. Both the CD's from the textbooks and the Internet have hundreds of short animations and images that will enhance the way in which I teach these difficult concepts. The technology I am proposing will allow my students to see these processes in action, therefore make learning more meaningful and permanent.

I have observed that most students become distracted on days when we must leave the classroom to go to the multimedia room in order to present PowerPoint and video presentations. The proposed technology will eliminate this distraction and help maintain a more organized learning environment for the projects that I currently direct.

I also expect that integrating this technology will foster more student interest in future science class enrollment. Students are very interested in technology. I believe that this interest will encourage students who are otherwise uninterested in Biology and Anatomy and Physiology to sign up for my upper level science classes because they are interested in the way I present the

information. I hope that this will in turn inspire those students to pursue science/technology related fields post high school.

Quest Foundation for Education Grant Expenditure Plan

Activity	100	200	300	400	500	Total
	Salaries	Benefits	Contractual Agreements	Materials and Supplies	Capital Objects	
Projector System and microscope video camera				Spare lamp - \$360.00 Projector installation kit - \$170.00	Projector - \$1350.00 Microscope video camera - \$935.00	\$2815.00